BEQUESTS IN THE US: PATTERNS, MOTIVES AND TAX POLICY

A Dissertation

by

KANG WANG

Submitted to the Office of Graduate and Professional Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Chair of Committee,	Li Gan
Committee Members,	Jonathan Meer
	Yuzhe Zhang
	Ximing Wu
Head of Department,	Timothy Gronberg

December 2016

Major Subject: Economics

ABSTRACT

This dissertation studies three topics on bequests and bequest motives. It firstly documents the patterns and time trends of bequest distributions. Then this dissertation estimates the impacts of bequests and estate taxation on the income distribution of children. Thirdly this dissertation provides new evidence on a positive relationship between children and bequest motives and reconciles the new findings with different the mixed evidence in literature.

On the distributions of bequests over time, this dissertation finds that bequests in aggregate are between 300 and 700 billions of 2012 dollars. Housing and financial assets dominant other bequeathable assets and account for over 60 percent of all bequests. Moreover, bequests are highly concentrated on the rich few that the top 10 percent decedents contribute over 60 percent of all bequests during 16 years. Finally, surviving spouses inherit almost all bequests of decedents and children inherit about 77 percent of all bequests if the decedents are single.

Despite the significant aggregate scale of bequests and the nontrivial average annual income generated by inheritances, the impacts of receiving bequests and imposing estate taxes are trivial—no more than 3 percent—on the income inequality of children. The reason is that the annual income from inheritance is too small that account for only about 3 percent of the total income of children and their households on average.

Last but not least, this dissertation finds that the opposite effects of the parents' belief of future help from children and the excessive financial burdens of some parents

on bequest motives and actual bequests lead to negative findings on the relationship between having a child and having a bequest motive in literature. Finally this dissertation reconciles the new evidence with the mixed evidence of bequest motives in literature.

DEDICATION

To my wife Jing and our son Elijah.

ACKNOWLEDGEMENTS

I would like to thank my committee chair, Prof. Gan, and my committee members, Prof. Meer, Prof. Zhang, and Prof. Wu. for their guidance and support throughout the course of this research.

Thanks also go to my friends and colleagues and the department faculty and staff for making my time at Texas A&M University a great experience.

Finally, thanks to my mother and father for their encouragement and to my wife for her support, patience, and love.

CONTRIBUTORS AND FUNDING SOURCES

This work was supported by a dissertation committee consisting of Professor Li Gan as the advisor, and Professors Jonathan Meer and Yuzhe Zhang of the Department of Economics and Professor Ximing Wu of the Department of Agricultural Economics. All other work conducted for the dissertation was completed by the student independently.

There are no outside funding contributions to acknowledge related to the research and compilation of this document.

TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

1. INTRODUCTION

This dissertation studies tree topics of bequests that the first one concerns the distribution of bequests left by the middle-aged and elderly Americans. The second topic is about the impacts of bequests on the income distribution of children. The third topic involves a puzzle in the bequest motives literature that refers to the relationship between having a child and having a bequest motive.

1.1 Patterns of time trends of bequest distributions between 1996 and 2012

Leaving bequests--whether planned in advance or not--was common for the majority of the middle-aged and elderly Americans between 1996 and 2012. By focusing on individuals above age 50 and their households in Health and Retirement Study (HRS), this paper firstly documents the patterns and time trends of bequests. Then we study the effects of bequest distribution on the income distribution of the children and their households of the middle-aged and elderly individuals.

In aggregate, the annual size of bequests fluctuates between 300 and 800 billion 2012 dollars[1]. The fluctuation of the overall scale of bequests and some economic indices, especially the housing price index, are significantly correlated. Moreover, the fraction of individuals that leave a positive amount of bequests dropped by 10 percent—from about 80 to 70 percent—during the 16 years. However, the fraction of individuals that finally leave a nontrivial amount of bequests increased from about 20 percent in

[1] All dollars mentioned in this dissertation are 2012 US dollars.

1996 to about 27 percent in 2006. As a result, the concentration of bequeathable wealth in the hands of the rich also increased over time. Last but not least, the surviving spouses inherit almost all bequests of their deceased partners. On the other hand, about three-quarters of all bequests left by single decedents are inherited by children.

1.2 Impacts of bequests and estate taxation on income distribution of children

To study the impacts of bequests on the income distribution of offspring, we firstly compute the annual income yielded by the inheritance using the actual rates of returns of different types of assets. Then we compare the income distributions before and after receiving inheritances, and the income distributions with inheritances before and after imposing the estate tax.

We find that although the annual income generated by inheritances are not trivial, and imposing an estate tax may reduce a 20 percent reduction of the aggregate inheritance income flow, the effects of inheritance income and estate tax on the income distribution of children is negligible. The reason is that the annual returns of inheritances compared with the household income of children are too small—about 2 percent on average and 7 percent at the median. As a results, receiving inheritances increases the income inequality—measured by Gini coefficient—of children households by no more than 3 percent. On the other hand, estate taxation reduces the income inequality by about 2 percent. Last but not least, we test three alternative explanations that may also lead to the limited effects of inheritance income flow and estate taxation. The results of the tests do not support the alternative hypotheses.

The rest of this paper is organized as follows. Section two of this chapter briefly summarizes the literature of bequest distribution and intergenerational inequality. Section three explains the reasons that we use the HRS data sets and the features of the data. The patterns and time trends of bequests are in section four, and the impacts of bequest distribution on the household income of children will be discussed in section five and six.

1.3 Children and bequest motives

Although it is natural to assume that having a child is a primary motive that leads to saving for bequests, the studies of bequest motives find mixed—and mostly negative—evidence on a positive relationship between having a child and having a bequest motive. For this reason, we re-examine the relationship between having a child and having a bequest motive by focusing on two factors—parent-child interactions and excessive financial burden.

We find that it is the parents' belief of future help from children rather than the history that the children ever helped lead to stronger bequest motives and more actual bequests. To be specific, single parents who believe that their children will help them with their daily lives or financial needs in the future tend to leave more bequests and to transfer more to their children when they are alive. On the other hand, single parents who have received help from their children usually hold less bequeathable wealth, dissave faster, and finally leave less bequests than the single decedents who never received help from children, including the ones without any child.

Moreover, we find that the single parents who usually receive help from their children have also spend larger fractions of their income for out-of-pocket medical purposes, compared with the parents that never get help from children and the decedents without any child. As a result, the excessive financial burden has negative impact on bequest motives and actual bequests. On average, the negative impact offsets—even overweighs—the positive effect on bequests due to the belief of future help from children.

Last but not least, this paper reconciles the new findings with the bequests motives—including accidental bequests due to a lack of bequest motives—studied in literature. This paper argues that because previous studies in literature do not separate the two opposite effects of belief in children and excessive financial burden on bequests, they find little evidence between having a child and having a bequest motive and draw conclusions that bequests are mostly accidental or due to an egoistic—or a warm-glow—motive. Although we find evidence of bequests motives for a subgroup of single parents with children, the exact type of the motives is still unclear.

The rest of this dissertation is organized as follows. Section two reviews the literature of bequest distributions, the effects of bequests and estate taxation on inter-generational inequality, and bequest motives. Section three documents the distributions of bequests and section four studies the effects of bequests and estate taxation on the distribution of household income of children. Section five estimates the effects of parent-child interactions and excessive financial burdens on bequest motives and actual bequests. Finally, we summarize the primary findings of this dissertation.

2. LITERATURE REVIEW

The earliest comprehensive study on the distributions of bequests is Laitner (1979) that the author studies the effects of inheritances on the national distribution of wealth and proves that there is a stationary distribution of wealth. Then Laitner (2002) estimates the impacts of bequests and *inter-vivos* gifts on the aggregate capital stock, private net worth, and public policy options through a simulation approach.

Although Poterba, Venti, and Wise (2012) do not directly study the distribution of bequests, they document the wealth trajectories using the HRS data sets and finds that the trajectories of most of the elderly are quite stable. For this reason, there findings shed light on the formation bequests.

On the effects of bequests on the wellbeing of offspring, Gale and Scholz (1994) finds that intended transfers account for at least 20 percent of US wealth. Moreover, De Nardi (2004) calibrates a structural life cycle model and finds that bequests increase intergenerational wealth concentrations.

On the impacts of estate taxation on intergenerational wealth and income inequality, De Nardi and Yang (2016) calibrate a structural model allowing estate taxation and find that increasing taxation increase the wellbeing of a newborn significantly, with a large welfare cost for the super-rich.

Although it is natural to assume that we can identify a bequest motive by comparing the wealth or consumption trajectories between households with and without

children, literature finds mixed evidence of a positive relationship between having children and having a bequest motive.

Hurd (1989) uses the number of kids as a sharp identification of having a bequest motive or not, and he finds that bequest motives are—even they exist—negligible and most bequests are accidental due to the increasing uncertainty of the time of death while aging. Using a similar approach, Gan, Gong, and McFadden (2015) also finds that the number of children does not identify bequest motives and therefore most bequests should be accidental. Kopczuk and Lupton (2007) to identifies a bequest motive with a fuzzy identification indicator function incorporated in a regime switching model. Although they control the number of kids, and the living distance between parents and children, as well as whether children are included in a life insurance policy, they also find no evidence that children are a major motive for bequests. Instead, they indicate that most bequest motives are egoistic.

On evidence that supports the positive relationship between having a child and having a bequest motive, Bernheim, Shleifer, and Summers (1985) find positive evidence of a strategic bequest motive that some parents exchange bequests for long term care from children. Moreover, Bernheim and Severinov (2003) argues that the equal division of bequests implies an altruistic bequest motives.

3. DATA AND IMPUTATION OF ACTUAL BEQUESTS

This dissertation adopts uniform data for all three papers by merging different data sets of Health and Retirement Study (HRS), a biannual longitudinal study started from 1992 that focuses on individuals above age 50 and their households. To be specific, the data sets are RAND HRS Data Documentation (Version O), RAND HRS Family Documentation (Version C), RAND HRS Income and Wealth Imputations (Version O), and the original HRS exit and post-exit interviews of each survey wave.

RAND HRS Data Documentation contains various categories of wealth holdings and income, health conditions, family backgrounds, and demographics. RAND HRS Family Documentation and RAND HRS Income and Wealth Imputations supplement the core data set by providing details of family members and within family interactions, income and wealth, and life insurance. Data of estates and the end of life wealth allocations are from the original HRS exit and post-exit data sets.

3.1 Summary of demographics of the decedents of interest

Because focus on studying the distributions of bequests, the people of interest are the middle-age and elderly decedents. Every two years, between 5 and 8 percent of the respondents die within two years after the HRS survey of last period. Table 1 summarizes some selected demographics—family structure, education, race, religious belief, sex, and age—of the decedents that are last observed every two years before death.

Table 1 Means of demographics of decedents at age 50 and above

	1996	1998	2000	2002	2004	2006	2008	2010
Family structure								
Couple with kids	0.48	0.45	0.43	0.40	0.44	0.39	0.40	0.45
Couple no kids	0.03	0.04	0.03	0.02	0.03	0.03	0.03	0.03
Single with kids	0.40	0.40	0.44	0.48	0.47	0.48	0.50	0.44
Single no kids	0.09	0.10	0.10	0.11	0.07	0.10	0.07	0.08
Education								
lower than high school	0.50	0.50	0.48	0.44	0.39	0.42	0.40	0.38
High school graduate	0.27	0.27	0.25	0.28	0.30	0.29	0.30	0.29
Some college	0.13	0.15	0.16	0.14	0.20	0.15	0.17	0.20
College and above	0.09	0.08	0.11	0.14	0.11	0.14	0.13	0.13
Race								
White	0.78	0.77	0.74	0.78	0.75	0.76	0.76	0.72
Black	0.16	0.17	0.17	0.14	0.14	0.15	0.16	0.19
Hispanic	0.05	0.05	0.08	0.06	0.08	0.07	0.07	0.07
Other	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02
Religion								
Protestant	0.66	0.67	0.67	0.66	0.64	0.65	0.64	0.68
Catholic	0.24	0.24	0.24	0.25	0.25	0.26	0.26	0.23
Jewish	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.02
None	0.05	0.05	0.05	0.04	0.06	0.05	0.05	0.05
Other	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01
Female	0.53	0.51	0.53	0.53	0.53	0.55	0.56	0.52
Age	79.15	78.96	78.99	80.69	79.66	80.50	81.01	79.92
Observations	1163	1277	1334	1144	1239	1189	1363	1005

Note: All variables expect age are dummies that a mean reflects the share of a specific group of decedents with respect to all decedents.

Individuals with a surviving spouse, partner, or at least one kid are more likely to survive than the singles and the ones without any child. Among the decedents, the share of couples varies between 40 to 50 percent, compared with over 60 percent of all respondents. The fraction of individuals without children among the decedents is between 10 to 15 percent while the fraction is only 8 to 9 percent of all respondents.

More educated individuals tend to outlive the less educated. The share of decedents with a college degree or above is between 8 to 14 percent, about 25 to 40 percent lower than the share of the most educated middle-aged and elderly population. The percentages of decedents with some college education or high school degrees are also a bit lower than the percentages of the population. However, the fraction of the least educated decedents—the ones who have only accepted lower than high school education—is about 40 to 52 percent greater than the fraction of the least educated population. In the subsequent sections, we will discuss the divergence of the mortality risk of different groups usually lead to higher bequest concentration.

3.2 Imputations of actual bequests

Due to the nontrivial nonresponse rates, this dissertation imputes the missing values of estates, life insurance, and trusts by the same approach used by RAND for income and wealth imputations. The imputation procedure begins with imputing the missing ownership by logistic models. Then we impute the missing brackets using the ordered logit models. Finally, we use the nearest neighbor method to replace a missing amount by the actual amount that is in the same bracket of the missing amount and has the closest prediction of a linear regression model for log amounts, conditional on

demographics, subjective probability of leaving bequests, physical and mental health conditions, and cognitive scores.

Figure 1 displays the distributions of log actual bequests before and after imputation. The overall distributions are similar except that the average amount of bequests after imputation is about 11 percent higher than the non-imputed average amount. This is due to a common fact of the survey data of household finance that wealthier individuals and household are more likely to refuse to report their financial status.

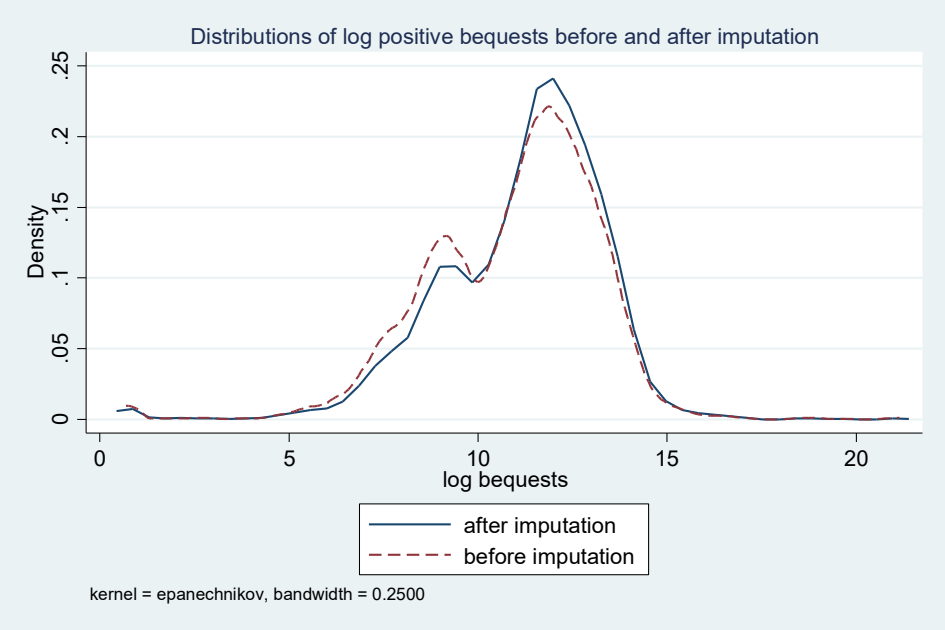

Figure 1 Distributions of log positive actual bequests before and after imputation

Note: We pool the 2012 dollar actual bequests of different waves since the distributions of bequests before and after imputation do not vary significantly over time.

4. BEQUEST DISTRIBUTION BETWEEN 1996 AND 2012: PATTERNS AND TIME TRENDS

To document the patterns and trends of bequests, this paper investigates the scale of bequests, the trend of leaving a bequest, seven principal inheritable assets, the degree of bequest concentration, and the division of bequests among recipients. To begin with, Table 2 summarizes the annual distributions of bequests and lists some important factors that reflect the scale, prevalence, concentration, and inclination of bequests.

Table 2 Biannual distributions of actual bequests (2012 $1,000)

	96-98	98-00	00-02	02-04	04-06	06-08	08-10	10-12
Mean	211.54	228.08	171.92	223.78	251.66	316.38	234.35	203.98
Std. Dev.	725.99	879.64	380.03	575.57	887.54	1260.39	1072.60	627.67
99%	1507.21	2756.23	2006.61	2430.85	3416.58	4429.28	2000.54	2000.00
95%	776.76	826.87	777.85	998.23	911.09	1109.54	882.90	918.63
90%	446.31	429.61	499.99	607.71	617.44	683.32	604.65	520.55
75%	181.67	180.00	181.33	218.36	231.99	221.46	210.58	200.00
50%	56.34	35.21	32.41	49.91	28.47	21.74	24.61	16.59
Fraction of positive bequests	82.60%	72.98%	71.17%	74.21%	67.99%	67.51%	67.45%	67.33%

Note: The summary of statistics is based on bequests no larger than 100 million dollars.

The average amount of biannual bequests varies between 170 and 320 thousand of 2012 dollars. On average, bequests have an increasing trend with periodic significant reductions. The first increasing trend is before 2000, and then bequests drops by a quarter between 2000 and 2002. Then the average amount of bequests rises again until 2008 and 2010 during which the average amount drops by about a quarter as well.

Despite the substantial average amounts, the distributions of bequests are highly skewed that the bequeathable wealth holdings increase exponentially disregard of different years. A direct implication of the highly skewed bequest distributions is that bequests are highly concentrated in hands of the rich, especially the richest 10 percent individuals and their households.

In addition, the fraction of decedents that leave bequests decreases steadily from 83 percent between 1996 and 1998 to 67 percent between 2010 and 2012.

4.1 Scale of bequests

Figure 2 shows the evolution of the aggregate amount of bequests between 1996 and 2012. Except the year 2012 that the aggregate amount of bequests is undervalued due to the data availability issue, the scale of bequests varies between 300 and 800 billion US dollars, equivalent to 2.4 to 4.7 percent of real GDP, or 0.9 to 1.6 percent of private wealth of all individuals above 50 and their households. The fluctuations of the bequest-to-GDP and bequest-to-wealth ratio imply that the time trend of the scale of bequests is less stable than the time trends of GDP and private wealth due to the high uncertainty of death of the elderly. Moreover, the evolution of the scale of bequests follows the time trend of the economy, especially in the economic downturns. For

example, the aggregate amount of bequests dropped rapidly between 1999 and 2001 when the dot-com bubble collapsed, and between 2008 and 2009 after the subprime mortgage crisis burst out. Last but not least, the fraction of decedents that leave a positive amount of bequests decreased from 83 percent in 1996 to 61 percent in 2012. The decreasing trend is primarily due to the decline of bequests left between 10 and 250 thousand dollars. On the contrary, the fractions of decedents leaving bequests above 250 thousand dollars was stable with a slight increasing trend.

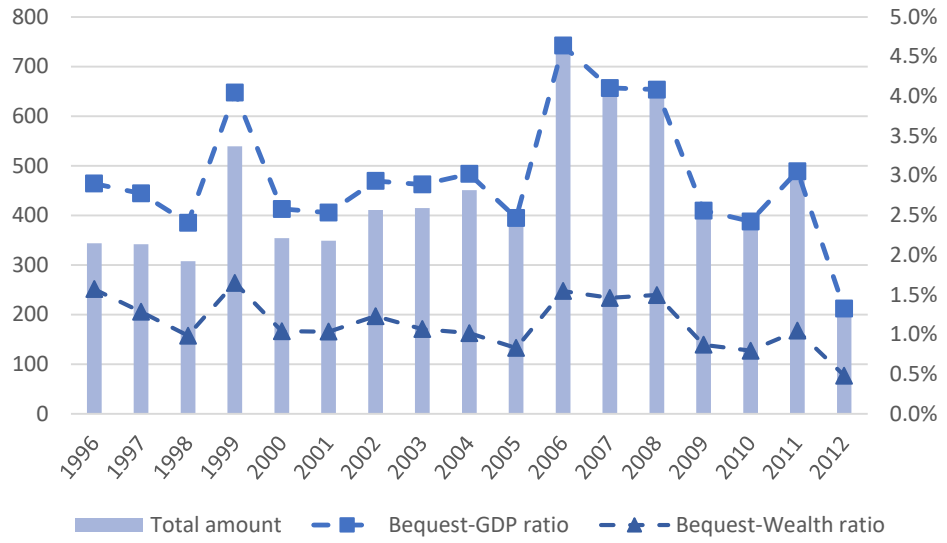

Figure 2 Scale of bequests (2012 billions) between 1996 and 2012

Note: Although HRS data are biannual, we can calculate the annual aggregate bequests since HRS tracks the exact date of death. Bequests and household wealth larger than 100 million are excluded from the calculations. The total amount of bequests in 2012 is undervalued by about a half because HRS survey are usually taken in the middle of an even year, and the data of the study in 2012 is not available yet.

Because the scale of bequests tracks the economy, we investigate the relationship between the scale of bequests and some primary economic indices. Figure 3 shows the correlations between the aggregate amount of bequests and GDP, private income, housing price index, stock index, and the prices of T-bills and T-bonds. Bequests in aggregate are moderately correlated with real GDP and household wealth. The correlation between the aggregate amount of bequests and the price of housing is highest since housing asset is the most important asset for all households, despite the livings or the decedents. The correlation between the scale of bequests and the stock price index and the price of bonds are weaker—lower than 40 percent—since most of the middle-aged and elderly individuals and their households do not invest a substantial amount of financial products until they are rich enough.

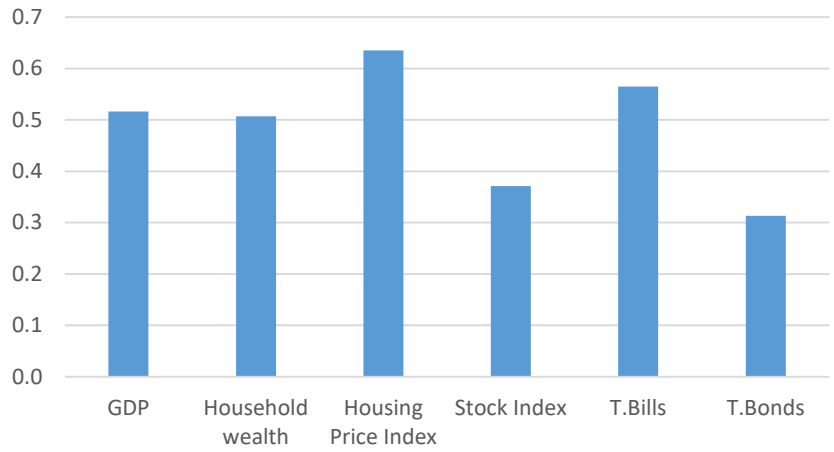

Figure 3 Correlations between the aggregate amount of bequests and primary economic indices

Note: Housing price index is from St. Louis FED. Stock index is the S&P 500 index. All indices are converted to the 2012 dollar.

4.2 Seven inheritable assets

HRS asks questions about the ownerships and amounts of specific assets that can be categorized as seven principal components—housing and real estate assets, non-housing financial assets, family business, retirement plans (IRAs), transportations, trusts, and life insurance policies—of bequest.

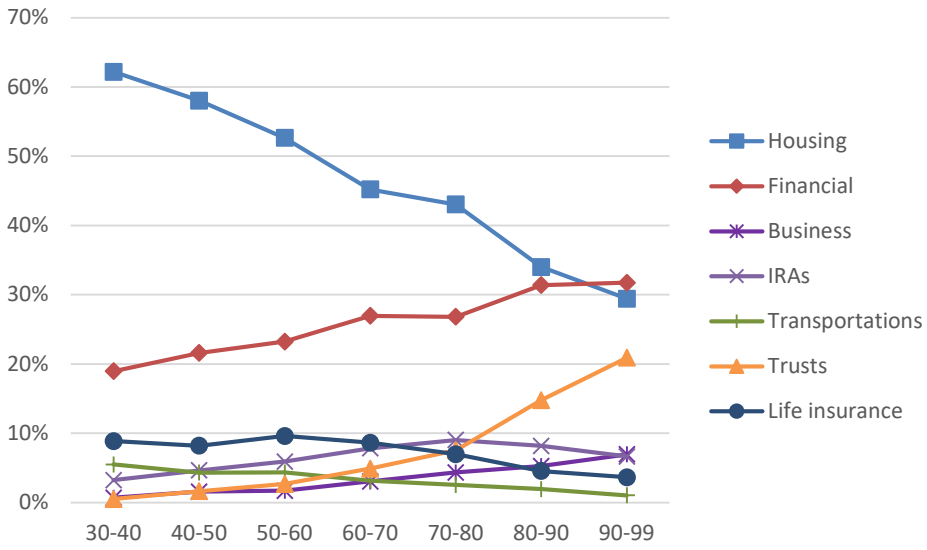

Figure 4 Percentages of bequeathable assets against quantiles of total bequeathable wealth

Note: Percentages are based on pooled bequeathable assets between 1996 and 2012. The percentages of each principal bequeathable assets are calculated by the aggregate amount of a principal asset divided by the aggregate total bequeathable wealth within each 10 percent interval of the total bequeathable wealth. The horizontal line shows the 10 percent intervals of total bequeathable wealth. Percentages of the bottom 30 percent total bequeathable wealth are omitted due to zero bequests.

Figure 4 displays the most important almost time invariant pattern of the bequeathable wealth portfolio that the portfolio varies significantly with total bequeathable wealth holdings. Housing and real estate assets are the primary

bequeathable assets for almost all classes of households except the top 10 percent. However, the share of housing and real estate assets is reduced by half from 60 to 30 percent as the total bequeathable wealth holdings get larger. On the other hand, the fraction of non-housing financial wealth—as the second largest bequeathable asset category—increases from 20 to 30 percent.

For the categories of the bequeathable wealth, the shares of trusts, family business, and retirement plans increase with total bequeathable wealth holdings, while the percentages of life insurance and transportations decrease. In particular, trusts and life insurance as two major assets designed for bequests have opposite trends. Trusts perform as typical luxury goods that the share doubles—from slightly lower than 10 percent to around 20 percent—within the top quartile. Life insurance, on the other hand, performs as an inferior good that the importance decreases as the wealth holdings increase.

4.3 Bequest concentration

In general, bequests are highly concentrated in the hands of the top rich decedents that the wealthiest 10 percent decedents, for example, have garnered between 60 and 70 percent of aggregate bequests. The next 40 percent decedents usually contribute the rest of aggregate bequests. Figure 5 shows the time trends of bequest concentration and the basic pattern described above does not change significantly over time.

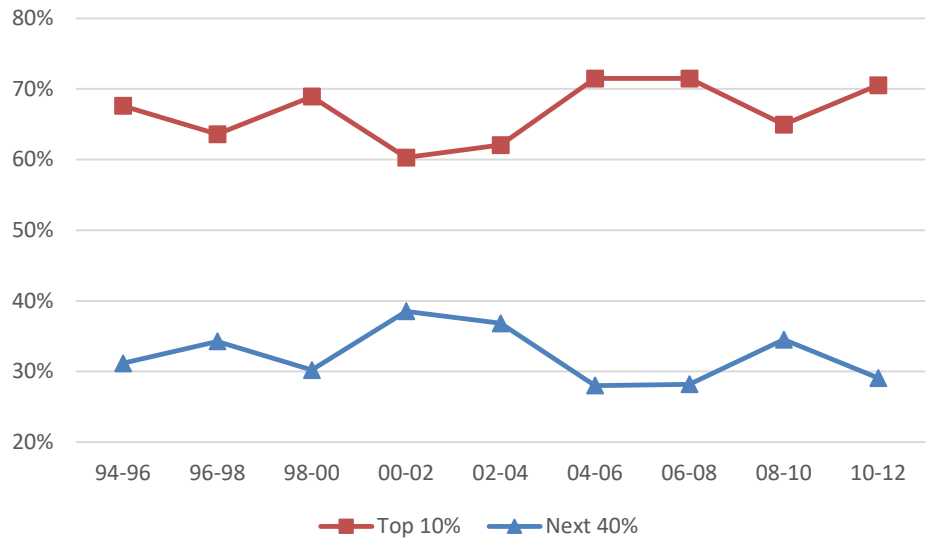

Figure 5 Fraction of bequests by actual bequests quantiles

Also, we investigate bequest concentration for different groups of decedents that the concentration is measured by the difference between the share of aggregate bequests and the fraction of all decedents. We find that bequests are significantly concentrated among decedents with wills probated or witnessed, and decedents with college or higher degrees. Bequests are slightly concentrated among white/Caucasian and male decedents. However, we find little concentration of bequests on different numbers of children, marital status, age cohorts, or religious beliefs.

4.4 Divisions of bequests among recipients

In the exit and post-exit interviews, HRS asks questions to the surviving spouse, children, or a financial respondent of a decedent about how bequests are divided among the recipients, namely the surviving spouse, children, charities, other relatives of the

decedent, and any other recipients. Table 3 lists the division of bequests among all recipients. About three-quarters of all bequests between 1996 and 2012 were inherited by the surviving spouses and 16 percent went to children and their households. The shares of other recipients were small.

Table 3 Division of bequests among recipients

	All households	Single households
Spouse	74.53%	0.00%
Children	16.37%	66.99%
Charities	2.58%	4.61%
Other relatives	4.19%	13.53%
Others	2.34%	14.87%

Note: This table omits the division of bequests of decedents that are died with a surviving spouse since almost all bequests were inherited by the surviving spouses.

When we condition on the marital status of the decedents, almost all bequests were inherited by the surviving spouses if the decedents were from couple households. On the other hand, the majority of bequests—about 67 percent—were inherited by children if the decedents died without a wife or a partner. Moreover, over three-quarters of all single decedents chose to distribute bequests equally among their children.

4.5 Summary

To document the patterns and time trends of bequests, we study the aggregate scale, prevalence, composition, concentration, and division of bequests. The aggregate

scale of bequests is substantial and tracks the development of the economy. Although the overall tendency of leaving bequests reduced about ten percent during the 16 years of study, the fraction of decedents that leaving moderate to tremendous amounts of bequests was stable with a slight increasing trend. Moreover, bequests are highly concentrated on the richest ten percent decedents that they contribute between 60 to 70 percent of all bequests.

We also separately investigate the patterns and time trends of seven principal bequeathable assets. Housing assets and the non-housing financial assets are the largest two categories that account for at least 60 percent of all bequests. On one hand, housing and real estates are dominant for households with bequeathable wealth holdings within the inter-quartile range and the importance of housing assets decreases rapidly with total wealth holdings. On the other hand, the share of the non-housing financial wealth increases with total wealth holdings that finally exceeds the share of housing assets for the top 5 percent decedents. All the other bequeathable assets take relatively small fractions of all bequests, expect trusts that the share increases dramatically within the top quartile of wealth and finally become the third largest bequeathable asset.

To fully document the distributions of bequests, we also calculate the shares of bequests inherited by each type of recipients. The surviving spouses usually inherit almost all bequests. For single decedents, over three-quarters of all their bequests are inherited by their children.

5. IMPACTS OF BEQUESTS AND ESTATE TAXATION ON INCOME DISTRIBUTION OF CHILDREN HOUSEHOLDS

One of the most important impacts of bequests on recipients is the distributional effect of bequests on household income of children. To be specific, we study income inequality of children and their households by estimating the Gini coefficients of children's household income without and with inheritance, and before and after imposing the estate tax. As we have addressed that almost all bequests are inherited by the surviving spouses, we focus on single decedents with children.

5.1 Annual returns of inheritances

Because different types of assets have different rates of return, we calculate the annual income flow of inheritance according to the actual returns of various bequeathable assets.

For the seven principle bequeathable assets, vehicles and life insurance benefits are usually inherited in lump sum instead of installments, and therefore we omit the annual income flow generated by these two asset categories. Since the housing and real estates are mostly residential, we use the residential rental yields to the calculate the annual income from housing and real estates. Moreover, since the rates of returns of different non-housing financial assets vary substantially, we break down financial assets to four categories, namely, stocks and funds, checking accounts and money markets, CDs, and bonds. Last but not least, although the rates of returns of different industries also vary significantly, we use the average rate of returns on equity to calculate the

returns of family business since HRS only contains the net value of family business without specifying the industries.

Table 4 summarizes the means of the annual income generated by inheritances and the rates of returns of different bequeathable assets.

Table 4 Mean annual income generated by inheritance components and the rates of returns

	Annual income of inheritance		**Annual rate of returns**	
	Pre-tax mean	Post-tax mean	Annual mean	Data source
Housing and real estates	5419.97	4958.58	7%	Residential rental yields
Family business	909.85	783.16	12.3%	Average rate of returns on equity
Stocks and funds	6602.73	4909.04	10.8%	S&P 500
Checks and money markets	703.58	619.83	2.9%	T-bills
CDs	416.72	264.56	3%	1-year interest rate of CD
Bonds	300.23	276.93	6.4%	10-year T bond
Trusts	1060.56	937.01	5.3%	Internal Revenue Code 7520
Total inheritance income	15413.64	12849.11		
Total inheritance income received by children	10906.82	9483.73		

Note: The return rate of a trust is calculated by the Internal Revenue Code 7520 that is usually used to value certain charitable interests in trusts.

On average, housing assets, stocks and funds yield the largest returns that account for over 75 percent of the total income generated by inheritances. Family business has the highest average rate of returns. More importantly, imposing estate taxes reduces the average annual income of inheritance by about 16.7 and 13 percent received

by all recipients and children recipients respectively. It is also worth to notice that the annual income generated by inheritable assets is highly concentrated that the recipients—mostly children—of the wealthiest 30 percent decedents finally acquire almost all inheritance income. Therefore, it is of great interest to study the impacts of the highly skewed income generated by inheritances on the household income of children.

5.2 Imputation of household income of children

Before we estimate the Gini coefficient of the household income of children, we impute the household income of children because HRS only provides the brackets of the household income since the survey wave four in 1998.

Because HRS has continuous income data for the third wave of survey in 1996, we impute the amount of income in the subsequent survey waves by the average amount of the wave three income with respect to one the five income brackets—zero to ten thousand, ten to thirty-five thousand, thirty-five to seventy thousand, above thirty-five thousand, and above seventy thousand—of the wave for imputation. For example, if the income of a child is between thirty-five to seventy thousand dollars in wave six, 2002, we impute the amount by the average income between thirty-five and seventy thousand dollars of wave three.

5.3 Impacts of bequests and estate tax on income of children households

Table 5 summarizes the means and quantiles of the imputed household income of children without bequests, with pre-estate tax bequests, and with post-estate tax bequests, and the household income of the decedents—the parents.

Table 5 Household income of children and their parents

	Mean	Quantile					
		10	25	50	75	90	95
Children household income, without bequests	79.25	5.27	36.68	75.54	108.05	167.47	175.88
Children household income, with bequests, no tax	81.81	5.54	36.81	75.54	110.97	170.2	177.03
Children household income, with bequests after tax	81.5	5.54	36.81	75.54	110.65	170.2	176.95
Household income of parents	42.54	9.06	14.26	25.69	47.3	80.9	118.76

On average, the household income of children is about 86 percent higher than the household income of the deceased parents. After receiving inheritances, the average annual income increases by about 3 percent, leading to about 92 percent higher annual income flow than their parents. On the other hand, imposing estate taxes reduces the average household income with the returns of inheritances of children by about 0.4 percent.

Then we estimate the Gini coefficients of household income of children to evaluate the impacts of inheritances and estate taxation on income inequality among children and their households. When estimating the Gini coefficients, we allow correlations of household income for children belong to the same family.

As shown in Table 6, the inequality of household income of children is moderate. Receiving inheritances increases the income inequality very lightly that the Gini coefficient only increases by about two percent. Moreover, the effect of estate tax in reducing the income inequality of offspring is almost negligible that the Gini coefficient decreases by only 0.8 percent after imposing the estate tax.

Table 6 Gini coefficients of household income of children

	Gini coefficients
Without bequests	0.4071***
With bequests, before taxed	0.4160***
With bequests, after taxed	0.4126***

Note: All Gini coefficients are based the household income of children from the single-parent families. The asterisks indicate that all Gini coefficients are significant at the 1 percent confidence level.

The reason of the very limited—almost negligible—effects of bequests and estate on the distribution of children's household income is that the amounts of inheritances received by children and their households are too small on average, compared with the scale of the children's household income before inheriting bequests. As implied by Table 5, the annual income generated by inheritances only account for about 3 percent of all household income of children.

5.4 Alternative explanations

Before reaching the conclusions, we discuss two alternative explanations that may lead to the same results of the limited effects of bequests and estate tax. We find that the alternative hypotheses do not explain the almost indifferent Gini coefficients properly, leaving the small scale of inheritance income the sole reasonable explanation.

5.4.1 Equal division

The first alternative explanation is the equal division of bequests that over three-quarters of the decedents distribution their bequests equally to their children. Therefore, if bequests are not distributed equally, we may observe larger effects of receiving inheritances and imposing estate taxes.

Table 7 Gini coefficients without equal division of bequests

	Gini coefficients			
	Equal division	Random assignment	To the richest kids	To the poorest kids
With bequests, before taxed	0.4158***	0.4171***	0.4182***	0.4139***
With bequests, after taxed	0.4124***	0.4130***	0.4135***	0.4115***

We examine the Gini coefficients under four different methods of diving bequests, namely equal division among all children, giving all to only one child randomly, giving all to the richest child, and giving all to the poorest child. We find that although the Gini coefficients (Table 7) vary under different division methods of bequests, the differences are too small. Therefore, equal division cannot explain the limited effects of bequests and estate tax on the distributions of household income of children.

5.4.2 Compensation for poorer children households

The second alternative explanation is that children with less household income do not receive much less bequests in aggregate. As a result, bequests tend to reduce or at least do not significantly increase the income inequality of children households.

Figure 6 shows the fractions of total inheritance income received by children and their households, conditional on the quartiles of the household income of children. It is clear that wealthier households also receive more inheritances that generating more annual income. Therefore, the second alternative explanation is also invalid.

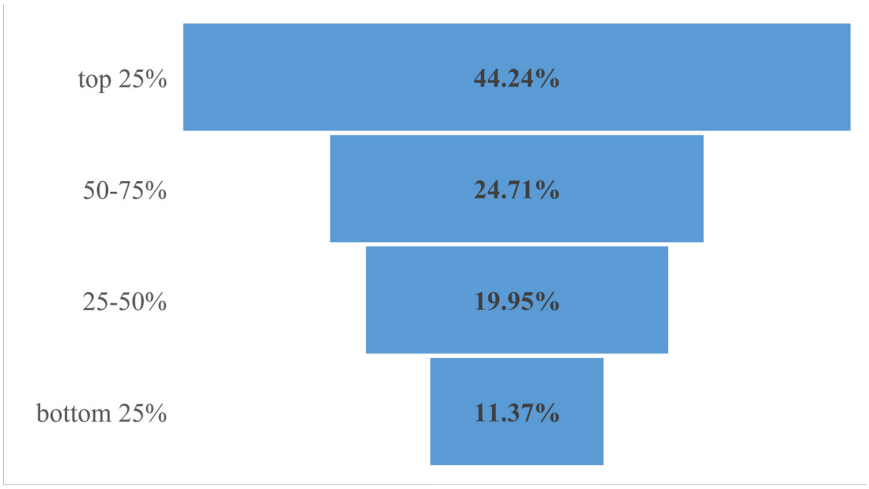

Figure 6 Share of inheritance income received by children by income quartiles of children

Note: Percentages in the bars are the shares of all inheritance income received. Marks on the left are the household income quartiles of children.

5.5 Summary

After documenting the distributions of bequests, we shift to study one of the most important topic of the impacts of bequests and estate tax—the effects of bequests and estate tax on the distribution of income of children and their households. By focusing on children of the single decedents, we find that bequests and estate tax have very limited—even negligible—effects on income inequality of children. We conclude that the reason is the tiny scale of annual income generated by inheritances. This explanation is robust since we examine and rule out two alternative explanations—the equal division of bequests, and the compensation for poorer children in aggregate.

6. CHILDREN AND BEQUEST MOTIVES: EFFECTS OF PARENT-CHILD INTERACTIONS AND EXCESSIVE FINANCIAL BURDENS

In this section, we study a puzzling issue in the bequest motives literature that although it is natural to assume a positive relationship between having a child and having a bequest motive, most studies find little evidence on such a positive relationship. As a result, the causes of bequests are either accidental—a lack of motive—or egoistic—a motive not related to any person except a decedent herself.

We argue that the studies do not find a positive relationship because they fail to separate two factors, namely the belief in children's future help and the excessive financial burdens, that have opposite effects for individuals with children on their bequest motives and the actual amount of bequests given. Without separately identify the two opposite effects, we cannot observe significant difference of bequests left between individuals with and without children.

Moreover, we focus on single decedents that die without a surviving spouse or partner. The reasons are twofold. As we have documented in section four, almost all bequests are inherited by the surviving spouses if the decedents are from couple households. Therefore, the bequest motives of decedents with a surviving spouse are less likely to be significantly correlated with their children. Even if some decedents have strong bequest intentions for children, since almost all bequests are inherited by the surviving spouses, it is difficult to find clear empirical evidence of the relationship between having a child and having a bequest motive. Secondly, because most previous

studies focus on single households, the results would be more comparable with the literature if we focus on the same group of people.

Last but not least, since bequest motives can be measured by the propensity of saving, we focus on the changes of bequeathable wealth within the last 6 to 8 years of life since most HRS respondents report that their financial planning horizons are between 5 and 10 years. The changes of bequeathable wealth is measured by the ratio of bequeathable wealth changes r_w between the initial period s and the last period T with respect to the wealth of the initial period w_s, $r_w = (w_T - w_s)/w_s$.

6.1 Interactions between parents and their children

Because HRS tracks the interactive activities between individuals above 50 and their children, we are able to study the effect of each interactive activity on bequest motives and the actual bequests giving. To be specific, the interactive activities are in form of providing help to each other. From children to parents, HRS asks whether a child ever helped her parent with daily activities or financially. HRS also asks about the belief of parents that their children will help them in the future, despite the children have ever helped or not. From parents to children, HRS asks the history that the parents ever helped to take care of grandchildren. Moreover, HRS also keep records about the *inter-vivos* transfers between parents and children.

6.1.1 Number of children and the changes of bequeathable wealth

Before we move on to study the parent-child interactions, we firstly illustrate the typical findings in literature that using the number of children to identify a bequest motive. Figure 7 shows the ratios of bequeathable wealth changes conditional on the

number of children. The figure indicates that on average, decedents without any child—the bottom bars—actually dissave less than decedents have children. This pattern is robust for over three-quarters of single decedents whose bequeathable wealth holdings generally decrease or do not increase significantly when approaching the end of life.

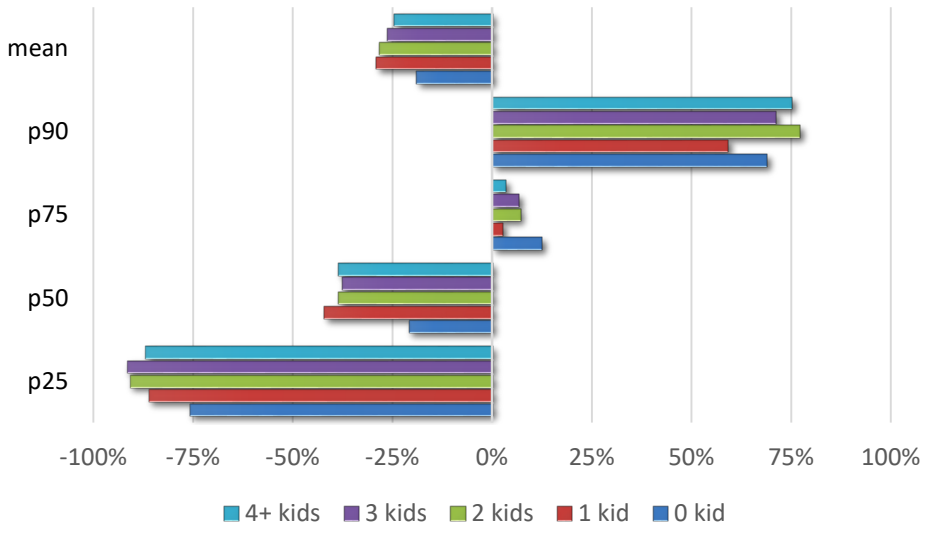

Figure 7 Ratio of bequeathable wealth change by number of children

Note: Figure lists the average ratio, and the ratios at the 25, 50, 75, and 90 percentiles.

To see why only using the number of child do not identify a bequest motive, in additional to conditional on the number of children, we also conditional on a bequest motive related variable—the dummy of having a will witnessed or probated, or not. We firstly find that decedents with a will are significantly more reluctant to exploit their wealth during the last years of life. The average ratio of bequeathable wealth change for

decedents with a will is about -19 percent, significantly higher than the ratio of decedents without any will -34 percent.

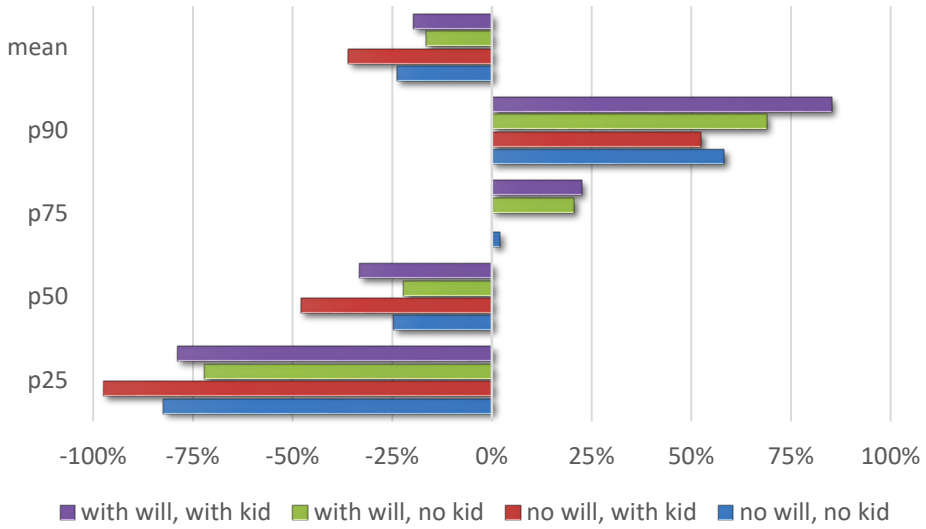

Figure 8 Ratio of bequeathable wealth changes conditional on number of children and will dummy

However, the difference of the ratio is much larger for decedents with children than for decedents without children. As Figure 8 shows, for decedents with children, the average ratios of having a will and not are -19.7 and -36 percent. For decedents without any child, the difference between the average ratios of having a will and not is much smaller, say -16.6 percent for having will versus -23.9 for not having a will. The descriptive evidence implies substantial heterogeneity of underlying bequest motives among single parents with children.

6.2.2 Parent-child interactions and the changes of bequeathable wealth

Among various interactive activities between parents and their children, we find that single parents who believe that their children would help them in all kinds of forms actually dissave less and are more likely to save during the last six to eight years of life.

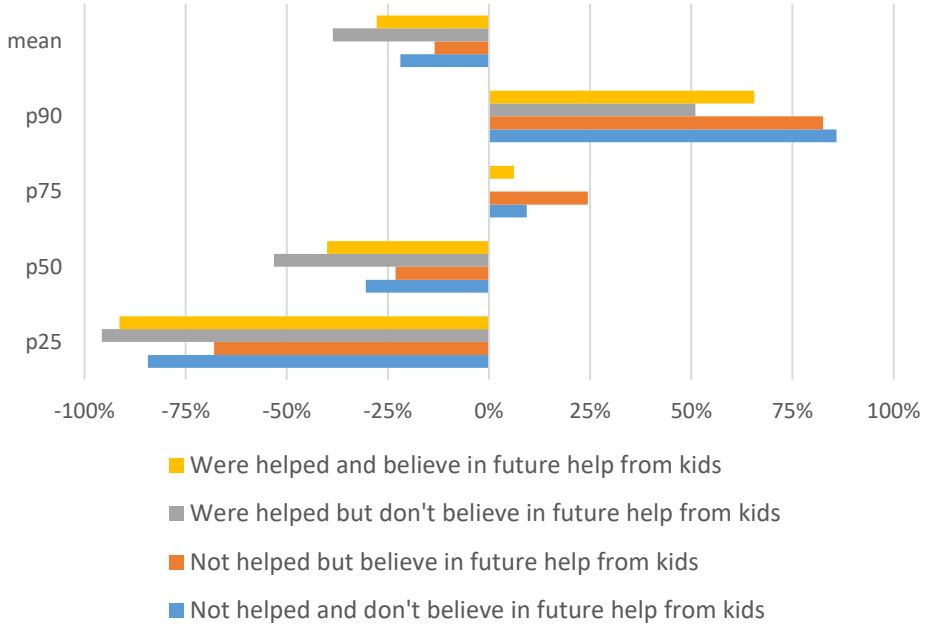

Figure 9 Ratios of bequeathable wealth changes conditional on the belief and history of help

Note: Ratios larger than 100 percent are excluded. Figure is drawn conditional on decedents having at least one child.

Using the same method, Figure 9 displays the changes in bequeathable wealth, conditional on the history of help from children, and the parents' beliefs of the future help from children. The figure clearly shows that the parents who are never helped by children during the last years of life dissave significantly less than parents under the alternative situations. On the contrary, parents who were helped but do not have a belief

of getting help from their children in the future have the highest tendency of using up their wealth.

We confirm this descriptive evidence by the actual bequest distributions conditional on the different types of parent-child interactions. Table 8 lists the actual bequest distributions conditional on four types of parent-child interactions plus the case of zero child. In general, focusing on the actual bequests yields similar results as focusing on the end of life wealth trajectories.

Table 8 Distribution of actual bequests conditional on types of interactions

	mean	p50	p75	p90
Not helped, don't believe in future help	173.7	5.4	114.3	605.2
Not helped, believe in future help	221.2	28.2	237.1	600.0
Helped, don't believe in future help	104.2	3.2	74.9	340.1
Helped, believe in future help	125.0	9.1	110.7	393.7
No kid	183.8	5.3	113.5	569.4

Note: The amounts of bequests are displayed as every 1,000 2012 dollars.

To be specific, the decedents that are never helped but believe in future help not only tend to dissave less, but also actually leave more bequests on average. Except the top 10 percent bequests givers, this group of decedents also leave significantly more bequests than any other group. Moreover, the decedents that are helped but no longer believe that their children will help in the future have the lowest ratio of bequeathable wealth change and they also turn out to leave the least amount of bequests on average.

Last but not least, a surprising finding is that the decedents with children but never receive help from them and neither believe in help in the future have similar average wealth trajectory and actual bequest distribution as the decedents without any child.

6.2 Excessive financial burdens

Although we have documented the different end of life wealth trajectories and the actual bequest distributions of decedents with different types of parent-child interactions. The reason that why the bequeathable wealth of a particular group of decedents depletes faster that lead to significantly lower actual amounts of bequest is still unclear.

To address this issue, we investigate that whether some single parents with children have excessive financial burdens compared with other single parents with and without children. In particular, we use the out-of-pocket medical spending to household income ratio to measure the financial burdens due to the high demand of medical services during the last years of life.

Table 9 shows the distributions of the out-of-pocket medical spending to household income ratios conditional on having a child or not, and on four types of parent-child interactions. On average, decedents with children have similar level of financial burdens as decedents without any child. However, when we investigate the financial burdens through the different types of parent-child interactions, we find significant variations. Consistent with the previous findings, decedents that are not helped and believe in future help have the lightest burdens, while decedents that are helped but do not believe in future help have the largest burdens, more than three times

higher on average than decedents of the first interaction type. Moreover, we also investigate the trajectories of financial burdens and find that the patterns are consistent over time.

Table 9 Out-of-pocket medical spending to income ratio

	Mean	p10	p25	p50	p75	p90
Kid dummy						
No kid	25.15	0.44	3.73	9.99	29.65	71.05
With kid	28.43	1.23	4.55	13.86	36.52	81.58
Interactions						
Not helped, with belief	16.53	0.73	2.88	8.32	20.54	37.67
Not helped, no belief	25.04	0.97	4.41	10.42	27.26	74.41
Helped, with belief	29.58	1.62	5.42	16.15	40.87	74.85
Helped, no belief	40.70	1.91	7.01	22.62	61.49	111.22

Note: All values are percentages.

6.3 Empirical models and results of estimations

To estimate the effects of the different types of the parent-child interactions, and the effect of the excessive financial burdens on the, we estimate a linear model for log actual bequests on kid dummy, dummies of helped before and belief of future help, the out-of-pocket medical spending ratio, and other covariates including the log initial wealth, net transfers between parents and children during the last years, conventional demographics and dummies indicating the year of death.

Table 10 summarize the covariates of interest that on average 87 percent of the single decedents died between 1996 and 2012 have one or more children in contact.

Over half of the decedents have ever got help from their children between 1996 and 2012. Also, over half of the decedents believe that their children will help them in the future, despite the history of whether helped by children. On average, decedents use nearly thirty percent of their household income to pay out-of-pocket medical bills

Table 10 Means of selected covariates of interest

Variable	Mean
Have kids	0.87
Helped by children	0.51
Believe in future help form children	0.55
Out-of-pocket medication spending to income ratio	0.28
Have kids × Out-of-pocket medication spending to income ratio	0.25
Kid helped × Out-of-pocket medication spending to income ratio	0.18
Kid help in future × Out-of-pocket medication spending to income ratio	0.13
Log initial bequests	10.7

Note: The first three variables are dummies and the rest variables are continuous. The sample contains 1875 individuals above age 50 that died between 1996 and 2012.

The results of estimations are in Table 10. The coefficients of the baseline model show evidence of both the effects of parent-child interactions and the excessive financial burdens.

On average, decedents will leave 30 percent more bequests if they believe that their children will be helpful one day in future, despite the history of ever helped by

children. On the other hand, if decedents are ever helped by their children, they will leave bequests less by over 50 percent.

Table 11 Estimations of the effects of parent-child interaction and excessive financial burdens

	Only kids	Kids and interactions	Kids and burdens	Baseline model
With kids	-.468**	-.323	-.642***	-.538**
Helped by kids		-.479***		-.578***
Belief in future help from kids		.451***		.322*
Out-of-pocket medical spending to household income ratio			-.757***	-1.097***
Out-of-pocket medical spending to household income ratio × helped				.671
Out-of-pocket medical spending to household income ratio × believe in future help				-.192
Log initial wealth	.999***	.985***	.991***	.977***
Demographics	Yes	Yes	Yes	Yes
R-squared	0.535	0.539	0.542	0.546

Note: All estimations exclude out-of-pocket medical spending to income ratio and wealth change ratio larger than 2. *, **, and *** represents the 10, 5, and 1 percent confidence level.

Moreover, the excessive financial burdens significantly reduce the amounts of actual bequests that a 10 percent increase in the out-of-pocket medical spending ratio will lead to an 11 percent decrease in actual bequests. As a result, the effect of the

excessive financial burdens overweighs the positive effect of the belief in children's future help.

Last but not least, the coefficients of the log initial bequeathable wealth are always significant and the levels are stable with respect to different model specifications. This implies that the bequeathable wealth holdings are very stable during the last years of life.

6.4 Reconciliation with the causes of bequests in literature

The findings of this section firstly explains the puzzle that many studies find little evidence between having a child and having a bequest motive. We find that on average, household with children even leave less bequests. However, for a particular group of the deceased parents, namely the ones that believe their children will help them in the future finally leave significantly more bequests. Therefore, the conclusion that most bequests are accidental due to the high uncertainty of the time of death during the late years omits the substantial heterogeneity in bequest motives for individuals with children.

Instead of accidental bequests, some studies conclude that bequests are primarily due to the egoistic motive—or the warm-glow motive in some literature—and therefore the amount of bequests is very weakly related to children. On one hand, we find evidence to support this conclusion since the coefficient of log initial wealth implies that the average wealth holdings are very stable and the wealthier individuals will finally leave more bequests. On the other hand, the findings in this paper suggests that the possibilities of a strategic or an altruistic motive are not slim. Since over half decedents have a belief that their children will help them in the future, and the coefficient of the

belief dummy is also significant, it is reasonable to infer that a nontrivial fraction of decedents may also have a strategic or an altruistic motive for bequests.

However, our findings so far cannot identify whether the belief of children's help in the future is due to a strategic motive that parents try exchange long term care from children with bequests, or an altruistic motive that parents simply care about the wellbeing of their children after they pass away.

7. CONCLUSIONS

By documenting the macro-patterns and time trends of the distributions of bequests left by Americans at age 50 and above between 1996 and 2012, this dissertation firstly finds that the aggregate scale of bequests is large and tracks development of the economy. Although the fraction of decedents that leave a positive amount of bequests decreased by over 10 percent during the 16 years, the fraction of decedents that leave moderate to substantial bequests slightly increased. This dissertation also finds that among all categories of bequests, housing and real estates, and non-housing financial assets are dominant that they account for at least 60 percent of all bequests. Moreover, the importance of housing assets while the fraction of financial assets increases with total bequeathable wealth holdings. Last but not least, bequests are highly concentrated on the rich decedents that the richest 10 percent decedents contribute over 60 percent of all bequests.

After documenting the patterns and times trends of bequest distributions, this dissertation shifts to study the impacts of bequests and estate taxation on annual income generated by the returns of inheritable assets, and the effects on the income distribution of the children of the decedents. This dissertation calculates the income from inheritances by the actual rates of returns of different assets. On the contrary to some findings in literature, this paper finds that bequests and estate tax on average have every limited effects—no larger than 3 percent—on the income of children. This dissertation indicates that the limited effects are due to the small scale of annual income of

inheritances. Compared with the scale of income of children households, the annual income from inheritances accounts for only about 3 percent of total household income of children. To get conclusive results, this dissertation test two alternative explanations that may also lead to the limited effects, and the tests rule out the alternatives.

The third topic studied in this dissertation is a puzzle in the bequest motives literature that many studies find counterintuitive results about little relationship between having a child and having a bequest motive. Through investigating the interactive activities between parents and children, as well as the financial burdens of the decedents, this dissertation finds that it is the opposite effects of the parents' belief of children's future help and the excessive financial burden of some parents eventually lead to negative findings on the relationship between having a child and having a bequest motive. Moreover, this dissertation estimates that effects of the positive belief and the excessive financial burden and the reconciles the findings in this dissertation with different evidence and conclusions in literature. To be specific, the conclusion of accidental bequests in literature is due to neglecting the heterogeneity of bequest preferences of parents, and the conclusion of dominant egoistic bequest motive overestimates the wealth effects and also neglects the different opposite preferences on bequests among individual with children.

REFERENCES

Bernheim, D., A. Shleifer, and L. Summers. 1985. “The Strategic Bequest Motive," *Journal of Political Economy*, 93 (6), 1045-76

Bernheim, D., and S. Severinov. 2003. “Bequests as Signals: An Explanation for the Equal Division Puzzle," *Journal of Political Economy*, 111 (4), 733-764.

De Nardi, M., 2004. “Wealth Inequality and Intergenerational Links," *Review of Economic Studies*, 71 (2004), 743-768.

De Nardi, M., and F. Yang. 2016. “Wealth Inequality, Family Background, and Estate Taxation," *Journal of Monetary Economics*, 77 (2016), 130-145.

Gale, W., and J. Scholz. 1994. “Intergenerational Transfers and the Accumulation of Wealth," *Journal of Economic Perspectives*, 8 (4), 145-60.

Gan, L., G. Gong, M. Hurd, and D. McFadden, 2015. “Subjective Mortality Risk and Bequests,” *Journal of Econometrics*, 188(2), 514-525

Hurd, M. 1989. “Mortality Risk and Bequests." *Econometrica*, 57 (4), 779-813.

Kopczuk, W., and J. Lupton. 2007. “To Leave or Not to Leave: The Distribution of Bequest Motives," *Review of Economic Studies*, 74 (1), 207-235.

Laitner, J. 1979. “Household Bequests, Perfect Expectation, and the National Distribution of Wealth," *Econometrica*, 47 (5), 1175-1193.

Laitner, J. 2002. “Wealth Inequality and Altruistic Bequests," *AEA Papers and Proceedings*, 92 (2), 1175-1193.

Poterba, J., S. Venti, and D. Wise, “Were They Prepared for Retirement? Financial Status and Advanced Ages in the HRS and AHEAD Cohorts,” *NBER Working Paper*, 17824, 1-48.